



Testing Benjamin Graham's net current asset value model

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HIGHLIGHTS:

1. Explains the concept of the net current asset value (NCAV).
2. Examines a hedging strategy as an attempt to improve the performance in the down market.
3. Demonstrates the performance of the NCAV model in different market conditions for different holding periods.
4. Provides some practical advice to individual investors in implementing their value investing strategies.

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ABSTRACT

The objective of this paper is to empirically test one of Graham's investment methods based on the net current asset value (NCAV). The NCAV is truly unique, and conservative, and commonly known as the net-net method. The ratio of the net current asset value to market value (NCAV/MV) was employed in this study to test a stock's performance comparing to the performance of S&P 500 as the market index. We used all stocks in Portfolio123 whose raw data were supplied by Compustat, Standard & Poors, Capital IQ, and Reuters for the period of January 2, 1999 to August 31, 2012. The overall results show that the firms with high net current asset values outperform the market. These results are strong in the up market. It can be argued that the firms with a high NCAV/MV ratio are likely to move toward their fundamental value and generate high excess return because its stock prices are now undervalued. The implications of the study are: (a) a positive NCAV/MV ratio may be a good indicator of the underpriced security; (b) investing in the growth period and avoiding the downturn period leads investors to earn much higher returns from the firms with a high NCAV/MV ratio; and (c) The NCAV/MV strategy requires a longer holding period of the portfolio in order to generate excess returns.

JEL Classification:

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1.0 Introduction

Benjamin Graham (1894–1976) was an American economist and one of the most successful professional investors in the history of the U.S. stock market. Considered by most to be the creator of the stock analyst profession, he developed the concept of value investing, and his specific techniques are well documented in his two most widely acclaimed books on investment: *Security Analysis* (with David Dodd) and *The Intelligent Investor*. His followers on value investing include many successful investment managers, such as Warren Buffett, William Ruane, Irving Kahn, Walter Schloss and Chris Johnston, among others. Buffett once stated that he had adhered to Graham's investment principles and posted investment results that had blown away the returns of the overall market.

The basic concept of value investing is very simple: invest in those companies with strong balance sheets, little debt, above-average profit margin, and ample cash flow. Graham's value investing strategy is based on the concept of net current asset value and apparently works very well as is discussed in the literature review section of this paper.

Despite the impressive results, however, the Graham's approach is relatively unknown to individual investors. That's probably because finding stocks meeting Graham's requirements requires some digging (Domash, 2013). It should also be noted that following the many ideas and techniques as presented in his books is very difficult to ordinary investors.

The main objective of this paper is to empirically test one of his investment methods based on the net current asset value (NCAV) which is truly unique and conservative and commonly known as the net-net method. This study will be different from the previous studies (e.g., Oppenheimer, 1986; Bildersee et al., 1993; Ying and Arnold, 2007) in that we offer a conceptual investment framework within which ordinary investors can design and construct a comfortable investment strategy for a long-term investment horizon under different market conditions. In addition, this study is using current data for stock prices and accounting information. As will be seen in the literature review section, all of the previous studies on classical value investing were done many years ago, and updated research would be needed to provide a more up-to-date guidance to investors. It is expected that the NCAV approach used in this study will be useful and practical so that ordinary investors can use it for making their investment decisions.

This study is important because as more traditional defined benefit plans in pension systems are being converted to defined contribution plans or hybrid plans in the United States in recent years, the employees' general understanding of how the U.S. stock market works has become increasingly important. Furthermore, it has been well documented that retail investors are known to have been engaging in sentimental investment decisions, which are not necessarily rational (Frazzini and Lamont, 2008; Fisch and Wikinson-Ryan, 2014). A report by the Library of Congress and a study by SEC staff also acknowledge that retail investors lack basic financial literacy (Library of Congress, 2011; Securities and Exchange Commission, 2012). Frazzini and Lamont (2008) found that retail investors "reduce their wealth in the long run" by "actively reallocating their money across different mutual funds"; and on average, they "direct their money to funds which invest in stocks that have low future returns" (Pages 299-300). Thus, our goal of this paper and future research is not to advocate a particular investment method that will work all the time, but to present empirical findings that support certain investment approaches which will bring positive results to the investors in the long run. The solid understanding of these findings will enable the employees (the general public as well) to choose funds in their retirement assets with a long-term perspective and manage them prudently.

The results of the study are very interesting. First, it is shown that the firms with high net current asset value outperform the market. These results are particularly true in the up market. As an attempt to improve the performance in the down market, a hedging strategy is used for each portfolio. This strategy clearly demonstrates a sign of decreasing risk and increasing excess return. The effect of using different holding periods on returns is also examined.

A comprehensive review of the literature related to value investing is presented in the next section, followed by an explanation of the concept of net current asset value (NCAV) in Section 3. Section 4 describes the research design of this study, and the empirical results are reported in Section 5. The conclusions and implications of the study are presented in Section 6.

2.0 Previous research

2.01 Empirical studies on classical value investing

Value investing is based on a simple idea of buying low and selling high. Although putting this idea into practice sounds simple, actual implementation of the investment idea can become rather complex because buying low and selling high can be based on several different valuation perspectives. For example, the valuation angles could be anchored on a number of different ways; values of companies can be computed using any numbers and/or combination of numbers in the income statement, balance sheet, and cash flow statement.

Basu (1977) and Cheh et al. (2008) examined the value investing hypothesis using the Price-Earnings (PE) ratio as a benchmark in finding cheap stocks relative to their earnings streams. They used stock prices as market-driven emotional numbers, while considering earnings as firmly-grounded fundamental numbers. Therefore, the investors' strategy of buying low PE stocks and later selling them when the low PE ratios move the stocks to a high PE ratio group falls into value investing camp. They found that investors could beat market averages by buying low PE stocks and selling them after the prices of purchased stocks reach a certain level.

In a study by Cheh et al. (2008), however, they demonstrated that this low PE vs. high PE idea in forming an investment strategy was far more complex than what it appeared. They found that market conditions and trading frequency mattered in the interplay of low PE vs. high PE stocks. During the rising bull market, risk-adjusted returns of high PE stocks were better than low PE stocks when investors rebalanced their PE portfolios annually.

But more frequent rebalancing of the PE portfolios tended to improve the performance of low PE portfolios, while lowering the performance of high PE portfolios.

Graham proposed a valuation model using numbers in the balance sheet: net current asset value (NCAV).¹ NCAV is generally more stable and predictable than the earnings stream, and valuing companies based on their liquidation value would be appealing to conservative investors. The first study involving NCAV was done by Oppenheimer (1986) over the period 1970 to 1983. Each year, a portfolio was formed consisting of companies that had a share price no more than two-thirds of their NCAV. Every twelve months, the portfolio was liquidated and new one was formed. The results were remarkable with an annual growth rate of 28.3 percent during the study period. During the same period, the rate from the benchmark portfolios selected from the New York Stock Exchange and the American Exchange was only 10.7 percent and the rate from a small firm index was 19.6 percent. A parallel study with similar results was carried out by Lauterbach and Vu (1993) using stock from Value Line over the period of 1977 to 1984.

NCAV is one of most attractive investment methods to investors who are serious about the downside risk of losing money, because stock prices precipitously fall, but NCAV investors often have the challenge of finding stocks that satisfy its stringent selection criteria of stocks extremely cheap. Therefore, it might have been made more sense of looking for such stocks in foreign equity markets during bullish market conditions such as 1980s. When Oppenheimer (1986) examined NCAV model for the study of period from 1970 to 1982, it might have been somewhat easier to find NCAV stocks because of the stock market crash of 1973 and 1974.

Considering the unavailability of suitable NCAV stocks in the US equity market for a large-scale study, Bildersee et al. (1993) examined the Japanese equity market for such stocks for the study period of 14 years from 1975 to 1988. They found that the NCAV portfolios outperformed the market on a risk-adjusted basis. Their success in finding a large enough sample size of such stocks in the Japanese equity market could possibly be attributed to the unsophistication of Japanese investors at that time and for the condition of the Japanese stock market that might have had further room to grow. The Japanese stock market crashed in 1989.

It is interesting to note that the ratio of NCAV over market value (MV) which was used by Bildersee et al. (1993) was zero, while the ratio that Oppenheimer (1986) used was 1.5 in seeking the margin of safety in such stocks beyond stock prices. Since zero was used in the Bildersee et al.'s study, a subset of the sample companies would not have any margin of safety that Graham (1973) advocated in laying out investment principles. On the other hand, Oppenheimer's NCAV stocks would have at least 50% margin of safety, since NCAV stocks in Oppenheimer's sample companies would have satisfied at least 50% more intrinsic value than stock prices. By using NCAV/MV of 1.5 instead of 1 in the Japanese stock market, the sample size of Bildersee et al.'s study might not have been large enough to be meaningful. This highlights the challenges of investors finding high NCAV/MV stocks. Consequently, we use three different levels of NCAV/MV in our study. Since the holding period of a portfolio might be an important factor determining returns, three different holding periods are examined in our study: four weeks, six months, and one year.

2.02 Variations in classical value investing approach

Although Benjamin Graham is almost synonymous with value investing and his investing methods are widely accepted among investors, there are several variations in his approach. Greenwald et al. (2001), for example, discussed different approaches to his philosophy of value investing. They break value investing into two camps: long-term and short-term. The long-term value investors, relying on the fundamental analysis, focus on the differences in the level of market prices and values of target companies for acquisition. On the other hand, the short-term value investors use fundamental analysis instead of using the differences of market price levels. Hence, they rely on changes in current market prices and their future expected changes based on forecasting activities of micro and macro factors.

Practitioners of such a more dynamic value investing approach include Martin Whitman (Whitman and Diz, 2013). Although Whitman is well-known for his expertise in distress investing (Whitman and Diz, 2009), his investing philosophy of resource conversion view is similar to what Greenblatt has been successful in taking advantage of risk arbitrage or special situations during the management of his hedge fund (Greenblatt, 1999). Nevertheless, Whitman's resource conversion view is not necessarily entirely new. Although Graham's more static and statistical approach to value investing (e.g., net current asset value method) is more widely known among investors, Graham is also known to have engaged in investing activities that take advantage of risk arbitrage situations; he called such

¹ Graham also provided stock selection criteria that included earnings factors, such as earnings stability, earnings growth, and PE ratio for investors with emphasis on the strong financial condition, uninterrupted dividend record, stability of earnings, and attractive stock price to assets ratios (Graham, 1973; Oppenheimer, 1986).

special investing situations as "workouts", and these investing operations in special situations are similar to what Whitman advocates with his resource conversion view (Graham, 1973; Whitman, 2013). Whitman's resource conversion view in value investing expands the traditional notion of the pure going concern view of an enterprise in business valuation that primarily considers the recurring incomes from its main operating activities. Thus, Whitman's pure going concern view is consistent with accountants' way of valuing a business, using clean surplus accounting (Lundholm and Sloan, 2012).

As sophisticated financial databases and advancement of computer technology have proliferated in recent decades, classical value investing opportunities - relying on a pure going concern view - have become less abundant than in the past. Thus, professional investors may have moved to employ more sophisticated investing techniques, using modernized value techniques that Whitman (2013) or other authors propose, while incorporating their traditional view of value investing into business valuation. This special situation value investing - employing risk arbitrage - may include mergers and acquisitions, spinoffs, buyouts, recapitalizations, liquidations, changes of control, and other investing activities that create wealth by putting resources to other uses including changes in ownership - than typically pure going concern operations (Whitman, 2013). These special situations create new investing opportunities; but investors may bear in mind that these new opportunities also entail additional risk that classical value investors may not typically consider.

3.0 Net current asset value

According to Benjamin Graham, net current assets are defined as current assets minus total liabilities (and preferred stock if any). Since current assets are cash and other assets that can be convertible into cash within a short period of time, such as receivables and inventories, his definition of net current assets is different from working capital, which is the difference between current assets and current liabilities. NCAV is also different from book value which is total assets minus total liabilities in that NCAV ignores long-term assets such as buildings, land, equipment, patents, etc. In fact, NCAV can be viewed as a revised version of the book value method. Since non-current assets are excluded in the calculation, Thorp (2010) stated that the NCAV method was a more rigorous standard compared to book value.

Graham's NCAV strategy calls for buying stocks trading at two-thirds or less of their net current asset value and selling when the share price is close to its NCAC. This is a very stringent requirement because NCAV is usually negative for most companies. Even though it is positive, NCAV per share will be rarely greater than the market price. Graham was looking for firms trading so cheap that there was a little chance of falling further.

4.0 Research design

To test the Graham's net current asset value method, the ratio of the net current asset value to market value (NCAV/MV) was employed in this study as the criterion in selecting stocks, and the results were compared to the performance of S&P 500 as the market index. A high NCAV/MV ratio indicates that the firm's stock is currently undervalued and therefore a large return is expected when the market is recovered and the firm's assets are fairly valued by the investors.

As the initial sample, we used all stocks in Portfolio123 (about 6,000 firms) which are supplied by Compustat, Standard & Poors, S&P Capital IQ, and Interactive Data.² The study period was from January 2, 1999 to August 31, 2012 because (1) the stock data are provided by Portfolio 123 only during this period and (2) previous studies tested the stock performance prior to this period, mainly for 1970s through 1990s.

The analysis of stock performance was conducted in two stages. First, all securities that satisfied the primary condition "NCAV/MV > market price" were selected. The 126 selected securities were then pooled into three different portfolios using the secondary condition "market price×N; N=1, 2, & 5" as follow:

Portfolio 1: NCAV/MV > market price×1
 Portfolio 2: NCAV/MV > market price×2
 Portfolio 3: NCAV/MV > market price×5

The final sample size for each portfolio was 84 firms, 32 firms, and 10 firms for Portfolio 1, Portfolio 2, and Portfolio 3, respectively. N was the weighing factor for the market price. For example, N=5 indicated that the NCAV/MV ratio

² The following weblinks can be visited for more details:

(1) <http://www.portfolio123.com/>
 (2) <http://en.wikipedia.org/wiki/Compustat>
 (3) <https://www.capitaliq.com/home.aspx>
 (4) <http://www.interactivedata.com/>

was higher than five times the market price, and therefore the stocks in this group would be more attractive for investors. It was expected that the stocks with a higher NCAV/MV value (e.g., N=5) would be generating returns higher than the stocks with a low value (e.g., N=1). Secondly, the yearly return performance of each portfolio was computed using yearly rebalancing frequency data which were available at the back-testing application of Portfolio123.com, and the results were compared to the performance of the S&P 500 in different market conditions.

Later, a hedging strategy was added in testing the performance of each portfolio. It was expected that the annualized returns of the portfolios with hedging would be much greater than the returns of the portfolios without hedging, particularly in the down market. Finally, the returns of different holding periods were tested: one year, six months and four months. It would be interesting to test how the returns will change as we change the holding period.

5.0 Empirical results

Exhibit 1 summarizes the statistics of NCAV/MV during the study period. The average values are 22.5, 51.5, and 129.9 for Portfolio 1, Portfolio 2, and Portfolio 3, respectively. These are simple annual averages of the NCAV/MV values during the study period. It is clear that the average values are increasing as N increases. Standard deviations and median values are also increasing significantly as N is increasing from 1 to 2 and to 5. Note that, out of 126 firms, 84 are in Portfolio 1, 32 in Portfolio 2, and only 10 in Portfolio 3.

Portfolios	Average	Std. dev.	Median	No of Firms
Portfolio 1	22.5	81.7	3.19	84
Portfolio 2	51.5	126.2	5.39	32
Portfolio 3	129.9	212.4	34.30	10

5.01 Returns without hedging

The annualized returns of three portfolios and S&P 500 during the study period are presented in Exhibit 2. Annualized returns are the returns that should have been realized every year to earn total returns during the study period. Theoretically, the stocks with a higher NCAV/MV value should be generating annualized returns higher than the stocks with a low value. The results of this study, however, are mixed. Portfolio 1 (4.15%) and Portfolio 2 (2.49%) beat the market with a big margin as shown in Exhibit 2, while Portfolio 3 (0.51%) does not do well compared to the S&P500 (0.96). It is also puzzling to see in Exhibit 2 that the returns are decreasing as the value of N is increasing from 1 to 2 and to 5. We believe that these mixed results are due to the fact that the number of firms in each portfolio is decreasing from 84, to 31 and to 10. As the sample size is getting smaller, the results of the study are getting less reliable and sometimes inconsistent. Finally, the A/B ratio in the last column is an index of the risk per unit of the standard deviation. A high ratio implies a relatively high return with respect to the risk given as the standard deviation. With the increase of the value of N, the ratio is decreasing consistently from 0.1513 to 0.0757 and to 0.0125.

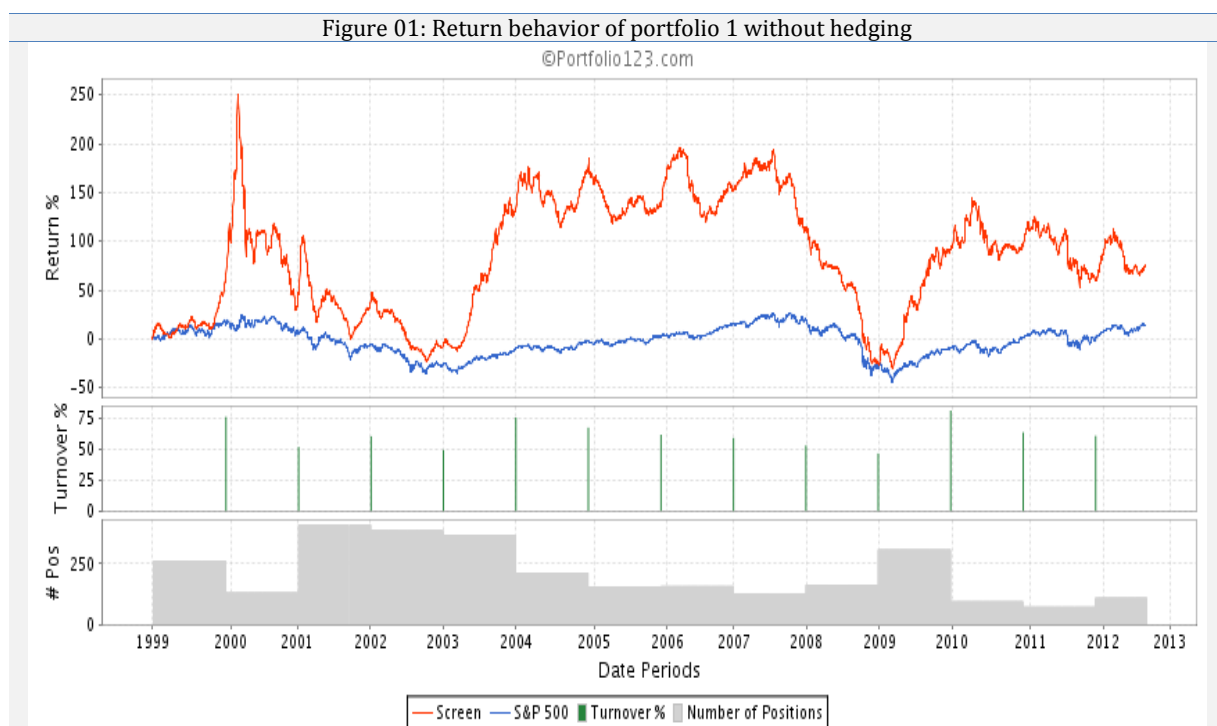
Portfolios	Annualized returns (A)	Std. dev. (B)	A/B
Portfolio 1	4.15%	27.10%	0.1531
Portfolio 2	2.49%	32.88%	0.0757
Portfolio 3	0.51%	40.60%	0.0125
S&P 500	0.96%	19.60%	0.04890

In order to compare the performance of each portfolio in both up and down markets, the average returns of each portfolio and S&P 500 during the study period are shown in table 3. Average returns are the simple averages of all rebalancing returns realized in backtesting using Portfolio 123 with one year holding period. The average return of three portfolios is slightly greater than 18 percent when the market return is only 2.91 percent, generating significant excess returns. The average return in the up market increases from 41.16 percent in Portfolio 1 up to 46.52 percent in Portfolio 3, when S&P 500 generates 14.55 percent only. The rates in the down market are negative for all portfolios, producing fairly significant negative excess returns. The market is doing better in the down market. It is clear that the NCAV method is good in the up market, but not in the down market, in all three portfolios.

Excess returns	Average returns	Up market	Down market
Portfolio 1	17.17%	41.16%	-25.99%
S&P500	2.91%	14.55%	-18.05%

Excess return	14.26%	26.61%	-7.94%
Portfolio 2	17.78%	45.28%	-31.71%
S&P500	2.91%	14.55%	-18.05%
Excess return	14.87%	30.73%	-13.66%
Portfolio 3	18.35%	46.52%	-32.34%
S&P 500	2.91%	14.55%	-18.05%
Excess returns	15.44%	31.97%	-14.29%

Figure 1 displays the return behavior of Portfolio 1 without hedging. In the figure, screen is the result of backtesting Portfolio 1 each year and presented along with the performance result of S&P 500. It can be seen that the performance of Portfolio 1 is better than that of S&P 500 every year, but it is much more volatile due to its higher standard deviation. Turnover is defined as the rate of trading activity in a fund's portfolio of investments, equal to the lesser of purchases or sales for a year, divided by average total assets. The number of positions is the number of stocks in the portfolio during a particular year. The return behavior of Portfolio 2 and Portfolio 3 is basically the same.



5.02 Returns with hedging

As an attempt to improve the performance in the down market, a hedging strategy was implemented for each portfolio. The strategy was that the market condition should be favorable before any stocks were purchased. Understanding that the Federal Reserve Board tends to increase interest rates during a growth period and that the yield of corporate stocks would fall, the specific rule in this study is to buy stocks when the 10-year Treasury yield are no higher than the yield 20 trading days ago. The background of this hedging strategy is explained in the two paragraphs that follow.

Alan Greenspan, former Chairman of Federal Reserve Board indicated that changes to the S&P 500 earnings yield had often been inversely related to changes in the long term Treasury yields (Board of Governors of the Federal Reserve System, February 24, 1998). This concept has been studied and extended by Yardeni and Quintana (2002) who coined it the "Fed Model". In its simplest form, the Fed Model states that if the forward earnings yield of a stock market is higher than long term treasury yield, then the market is undervalued and vice-versa. A stock market's equilibrium can therefore be stated as:

$CEY = TB_Y$, where CEY is Current Estimated Yield (S&P current year estimates divided by S&P price) and TB_Y - Treasury Note Yield (10 year).

The premise is that if the expected earnings yield of the market is equal to or lower than what an investor can earn

risk-free on a 10Y note, then it does not pay to hold stocks. Conversely, if the S&P yield is higher than the 10Y note, then investors are receiving a premium for taking the additional risk inherent in stocks.

In reality, however, it has been suggested not to rigidly rely on a simple view of the Fed model which recommends that stocks should be purchased if earnings yields are above treasury yields. There's no evidence the Federal Reserve Board has ever viewed the relationship between stocks and treasury yields this way, and there has been no research elsewhere that would support its viability as a day-to-day investment strategy. Instead, it is suggested to use the Fed model as a framework around which an investor can create and test buy and sell rules based on the relationship between earnings and treasury yields as well as trends in the model's underlying components. Hence, we used the following 20-day rule as the benchmark, requiring that market conditions be favorable before any stocks can be purchased:

Close (0,#TNX) <= Close (20,#TNX) (The treasury yield is not higher than where it was 20 trading days ago.)

The results using the 20-day rule are reported in table 5. They show that, assuming one year holding period, the standard deviations of returns of each portfolio with hedging become much less in all three portfolios (see table 2 without hedging), demonstrating a sign of decreasing risk.

Portfolios	Annualized returns (A)	Std. dev. (B)	A/B
Portfolio 1	16.84%	17.59%	0.957
Portfolio 2	17.48%	21.89%	0.798
Portfolio 3	19.37%	27.35%	0.708
S&P 500	0.90%	19.60%	0.489

The return pattern of portfolios with hedging is even more intriguing, as shown in Exhibit 6. Comparing these results with those without hedging in Exhibit 3, there is not much difference in the pattern of excess returns with hedging during the up market as shown below:

	Without hedging	With hedging
Portfolio 1	41.16%	37.17%
Portfolio 2	45.28%	40.57%
Portfolio 3	46.52%	47.57%

However, during the down market, excess returns are significantly better with hedging in all three portfolios, beating the market with a wide margin:

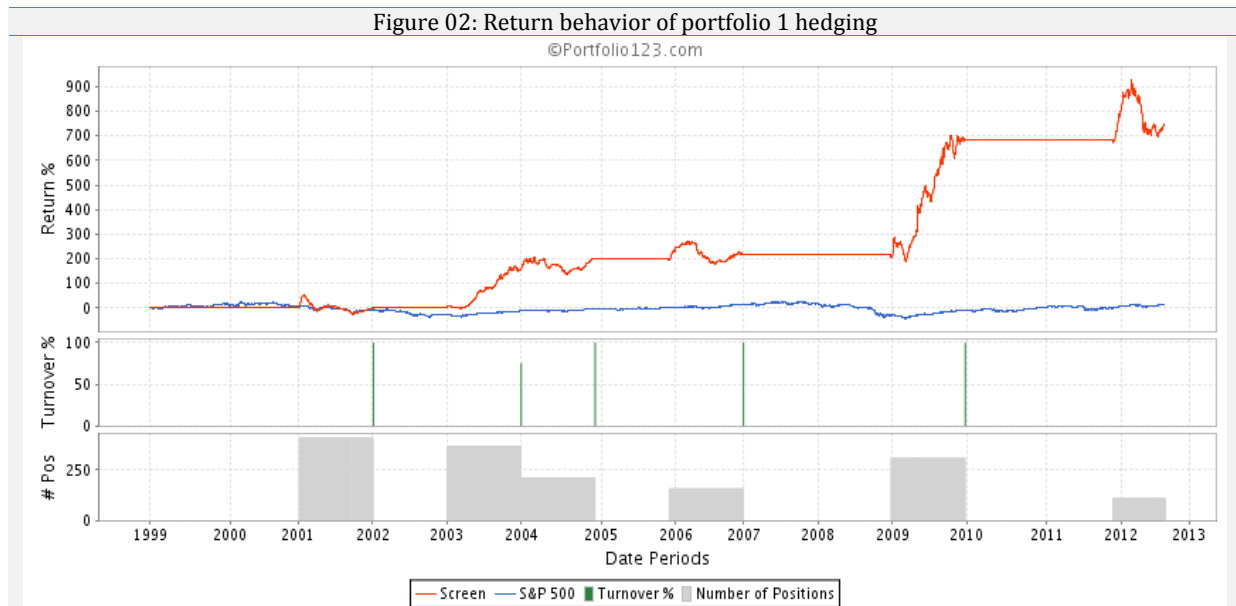
	Without hedging	With hedging
Portfolio 1	- 25.99%	- 0.01%
Portfolio 2	- 31.71%	- 1.12%
Portfolio 3	- 32.34%	- 1.29%

Figure 2 shows the results in a graph, demonstrating that the portfolio return beat the market with a significant margin during the 2009 down market.

Excess returns	Average returns	Up market	Down market
Portfolio 1	23.90%	37.17%	0.01%
S&P 500	2.91%	14.55%	-18.05%
Excess return	20.99%	22.62%	18.06%
Portfolio 2	25.68%	40.57%	-1.12%
S&P 500	2.91%	14.55%	-18.05%
Excess return	22.78%	26.02%	16.94%
Portfolio 3	30.12%	47.57%	-1.29%
S&P 500	2.91%	14.55%	-18.05%
Excess return	27.21%	33.02%	16.79%

5.03 Returns for different holding periods

To examine the effect of using different holding periods, each portfolio was rebalanced again with the holding period of six months and four weeks, and the results are shown in table 8 along with the results of one-year rebalancing results: Part A for Portfolio 1, Part B for Portfolio 2, and Part C for Portfolio 3. It is clear that the holding period can have a significant impact on the performance of portfolio. In general, the longer the holding period of a portfolio is, the higher the returns that are realized.



As the holding period is getting shorter, the performance of the portfolio becomes low and cannot beat the market. This is particularly true for the returns with hedging. It appears that hedging is directly correlated with the holding period and consequently generates more consistent returns as the holding period changes. This procedure was repeated with rebalancing each portfolio every six months and every four weeks, and the results were basically the same. It is also interesting to note in table 7 that, as the holding period is getting longer, the standard deviation as a risk measure is gradually decreasing for all three portfolios.

Table 08: Performance under different holding periods

Part A: Portfolio 1 (NCAV/MV > Price×1)				
Holding periods	Annualized returns without hedging		Annualized return with hedging	
	Returns	Std. dev.	Returns	Std. dev.
One year	4.15%	27.10%	16.84%	17.59%
6 months	0.96%	27.06%	2.51%	18.23%
4 weeks	4.00%	32.60%	-3.28%	21.16%

Part B: Portfolio 2 (NCAV/MV > Price×2)				
Holding periods	Annualized returns without hedging		Annualized return with hedging	
	Returns	Std. dev.	Returns	Std. dev.
One year	2.49%	32.88%	17.48%	21.89%
6 months	-0.47%	32.37%	2.55%	22.45%
4 weeks	2.67%	41.78%	-3.11%	24.01%

Part C: Portfolio 3 (NCAV/MV > Price×5)				
Holding periods	Annualized returns without hedging		Annualized return with hedging	
	Returns	Std. dev.	Returns	Std. dev.
One year	0.51%	40.60%	19.37%	27.35%
6 months	-1.87%	40.03%	4.28%	28.91%
4 weeks	1.60%	56.25%	-1.31%	28.46%

Table 9 shows two graphs on return behavior of Portfolio 1, without hedging, with six months rebalancing (Part A) and four weeks rebalancing (Part B). As the stock holding period is decreasing from one year (Figure 1) to six months, and finally to 4 weeks, returns are generally decreasing. When the hedging strategy is introduced to Portfolio 1 as shown in Part A and Part B of table 4, returns are getting even worse. With four weeks rebalancing, Part B shows that the portfolio returns are almost always below the market. Basically, the same results have been obtained for Portfolio 2 and Portfolio 3.

Figure 03: Return behavior without hedging

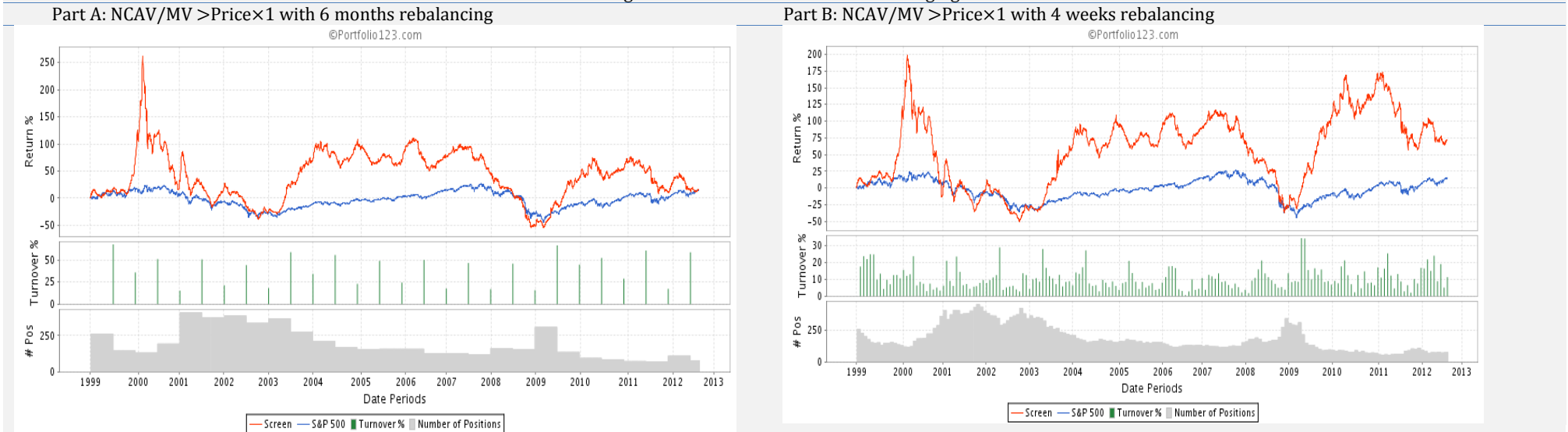
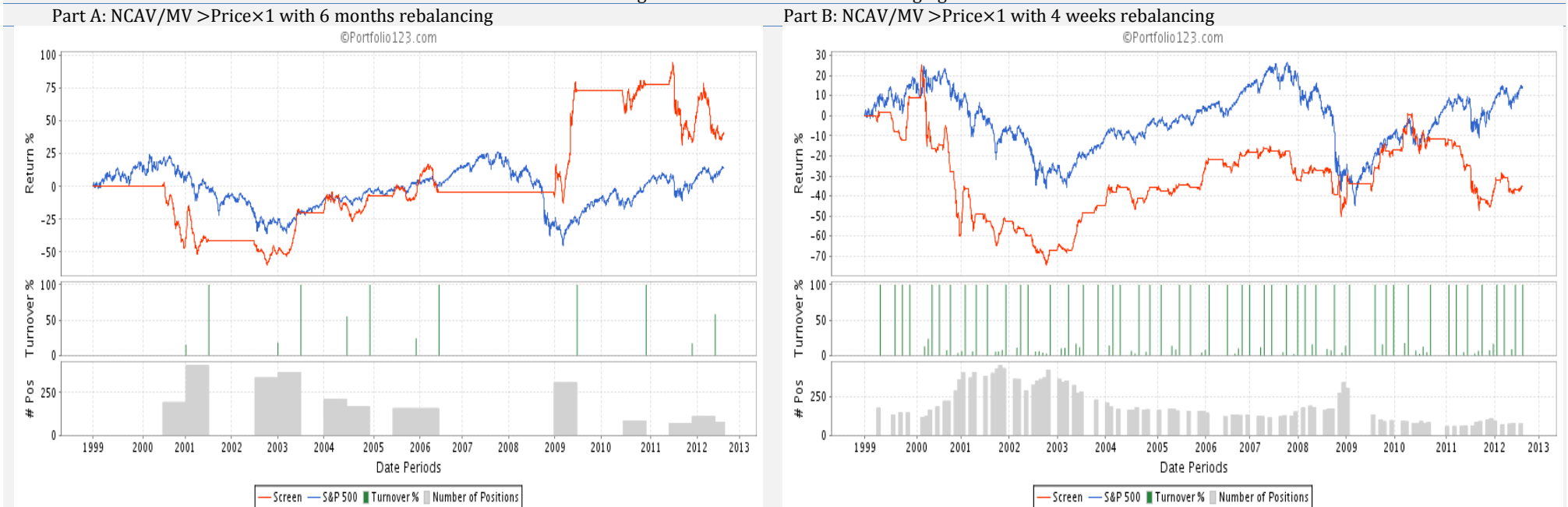


Figure 04: Return behavior with hedging



6.0 Conclusions and policy implications

The main objective of this paper is to test the performance of Graham's NCAV approach using the data provided by Portfolio123.com. The overall results of this study give empirical evidence that the firms with a high net current asset value outperform the market. These results are strong in the up market. It can be argued that the firms with a high NCAV/MV ratio are likely to move toward the fundamental value and generate high excess return because their stock prices are now undervalued. The implications of the study are: (a) A positive NCAV/MV ratio may be a good indicator of the underpriced security; (b) Investing in the growth period and avoiding the downturn period leads investors to earn much higher returns from the firms with a high NCAV/MV ratio; and (c) The NCAV/MV strategy requires a long holding period of the portfolio in order to generate excess returns.

It should be noted that retail investors' irrational decision-making behavior, coupled with their lack of basic financial literacy, are expected to reduce their wealth. Our research findings provide further evidence that value investing approach in the long run could positively contribute to the increase in retail investors' retirement assets. With increasing evidence on the importance of value investing, working professionals should consider a long-term horizon-based value investing approach more highly than short-term sentiment-based frequent trading activities; this investing philosophy will encourage taxpayers to support management of retirement systems based on the principles of intrinsic value, not speculation - whether they are managing 401(k) type retirement accounts or vested in traditional pension systems. It is not surprising that Warren Buffett, one of richest men in the world, is an ardent advocate of value investing.

Further research will be needed to draw definite conclusions on the NCAV method of investing. For example, extending the study period and adding more sample firms will definitely improve the relevance of the study. Using different definitions of the market condition may also provide more insights on the NCAV method. The 10-year treasury bill was used as the surrogate the market condition in this study, but other benchmarks could be used, such as S&P 500 risk premium, TTM S&P 500 EPS, Current-year S&P 500 EPS estimate, Next-year S&P 500 EPS estimate, or S&P 500 yield. Using different benchmarks, new buy-and-sell rules can be created and tested on the relationship between earnings and market conditions.

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